

REMARKS

Claims 55 and 56 are pending in this application. Claim 56 has been amended. No new matter has been introduced.

The title of the invention has been amended to more clearly describe the subject matter of the claimed invention. Replacement drawing sheets are submitted for the Examiner's approval. The replacement sheets omit character "0.35" and its corresponding line from Figure 5.

Claims 55 and 56 stand rejected under 35 U.S.C. §112, first paragraph, as the limitation "substantially pure metallic" is not disclosed in the specification. Applicants submit that, although the specification indicates that "along with the (CO₂) groups, the carbon from the deposited saturated organo-rhodium monolayer is removed and a pure metallic rhodium layer forms on the surface of the substrate 20" (application at ¶[0032]), the specification also notes that carbon contamination is only "greatly reduced" (and not entirely eliminated), "as carbon is removed with the use of oxygen." (Application at [0032]). Accordingly, the limitation "substantially pure metallic" is disclosed in the specification. Applicants submit that all pending claims are in full compliance with 35 U.S.C. §112.

Claims 55 and 56 stand rejected under 35 U.S.C. §102(a) as being anticipated by Soininen et al. (U.S. Patent No. 6,482,740) ("Soininen"). This rejection is respectfully traversed.

The claimed invention relates to a capacitor comprising a rhodium layer formed by atomic layer deposition. As such, independent claim 55 recites a "capacitor" comprising "a first electrode and a second electrode" and "a dielectric provided between said first electrode and said second electrode." Independent claim 55 also

recites "at least one of said first and second electrode comprising a continuous ALD deposited rhodium film with a substantially pure metallic rhodium composition."

Amended independent claim 56 recites a "capacitor" comprising "a first electrode and a second electrode," "a dielectric provided between said first electrode and said second electrode" and "at least one of said first and second electrode comprising a substantially pure metallic rhodium layer." Amended independent claim 56 also recites that the substantially pure metallic rhodium layer is "formed by rhodium atomic layer deposition of dicarbonyl cyclopentadienyl rhodium at a temperature of about 100°C to about 200°C."

Soininen relates to a method of forming conductive layers suitable for use in an integrated circuit. Soininen teaches that "a metal oxide thin film is deposited on a substrate surface and reduced thereafter essentially into a metallic form with an organic reducing agent." (Abstract). According to Soininen, a "metal oxide thin film is grown on the diffusion barrier 14 from alternate pulses of a metal source chemical and oxygen source chemical." (Col. 7, lines 26-29). Soininen recites that the "pulsing cycle is repeated until the thickness of the metal oxide film is sufficient for seed layer purposes" and then the "metal oxide film is reduced into a metal layer." (Col. 7, lines 33-36).

The subject matter of claims 55 and 56 is not anticipated by Soininen. Soininen fails to disclose, teach or suggest all limitations of independent claims 55 and 56. Soininen does not disclose, teach or suggest first and second capacitor electrodes, "at least one of said first and second electrode comprising a continuous ALD deposited rhodium film with a substantially pure metallic rhodium composition," as independent claim 55 recites. Soininen teaches a metal oxide layer formed by ALD, and not an "ALD deposited rhodium film," much less an "ALD deposited rhodium film with a substantially pure metallic rhodium composition," as in the claimed invention.

Soininen also fails to disclose, teach or suggest that at least one of the first and second electrodes comprises "a substantially pure metallic rhodium layer formed by rhodium atomic layer deposition of dicarbonyl cyclopentadienyl rhodium at a temperature of about 100°C to about 200°C," as amended independent claim 56 recites. In Soininen, the metal film formed at the end of its dual-step process is not "a substantially pure metallic rhodium layer," much less "a substantially pure metallic rhodium layer" that is "formed by rhodium atomic layer deposition of dicarbonyl cyclopentadienyl rhodium at a temperature of about 100°C to about 200°C," as in the claimed invention. As noted, Soininen teaches first the formation of a metal oxide film and then subjecting the metal oxide film to an organic reducing agent. Thus, Soininen is silent about an "ALD deposited rhodium film," or "a substantially pure metallic rhodium layer" which is "formed by rhodium atomic layer deposition," as in the claimed invention.

Applicants reaffirm that the limitation "a continuous ALD deposited rhodium film" is not a product-by-process limitation, but rather a *resulting structure* having distinct and defined characteristics. Applicants submit that courts have unanimously recognized that "where it is not possible to define the characteristics which make it (an article) inventive except by referring to the process by which the article is made, he (the Applicant) is permitted to so claim his article, but is limited in his protection to articles produced by his method referred to in the claims." In re Moeller, 117 F.2d 565, 568 (CCPA 1941).

For example, in R2 Medical Systems, Inc. v. Katecho, Inc., which involved a claim reciting that one element be "affixed" to another, the court found that "'affixed' means 'to be attached physically.'" R2 Medical Systems, Inc. v. Katecho, Inc., 931 F.Supp. 1397, 1425-26 (N.D. Ill. 1996). The Court held that "[T]he terms of the claims do

not indicate that 'affixed' refers to a process by which the stannous chloride is bound to the conductive plate, but only that it refers to the result of that process." Id. (quoting CVI/Beta Ventures, Inc. v. Custom Optical Frames, Inc., 893 F. Supp. 508, 519 (D. Md. 1995) (limitation that element be in 'work-hardened pseudoelastic metallurgic state' is directed to the structure, not the process, of manufacture)).

In Hazani v. U.S. Int'l Trade Comm'n, which involved patent claims to a memory cell comprising a conductive plate having a surface that was "chemically engraved," the Federal Circuit also held that the claims were "pure product claims" and not product-by-process claims. Hazani v. U.S. Int'l Trade Comm'n, 126 F.3d 1473 (Fed. Cir. 1997). The Federal Circuit reasoned that the "chemically engraved" limitation, read in context, described the product more by its structure rather than by the process used to obtain it. Id.

In the present case, claim 55 recites the limitation "continuous ALD deposited rhodium film" which is a structural limitation and not a product-by-process limitation. A "continuous ALD deposited rhodium film" is a *resulting structure* having distinct and defined characteristics, for example, a particular thickness and composition, such as a reduced carbon content. Applicants submit that a rhodium film with a reduced carbon content cannot be achieved by CVD or PVD, for example, as these processes do not involve a layer-by-layer deposition that could facilitate the removal of carbon. Thus, in view of R2 Medical Systems and Hazani, the limitation "a continuous ALD deposited rhodium film" is a structural limitation.

For at least the reasons above, Soininen fails to disclose all limitations of claims 55 and 56, and withdrawal of the rejection of these claims is respectfully requested.

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Allowance of all pending claims is solicited.

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Respectfully submitted,

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AMENDMENTS TO THE DRAWINGS

The attached sheets of drawings includes a request for omitting character "0.35" and its corresponding line from Figure 5, for Examiner's approval.

Attachment: Replacement sheets